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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,454	08/13/2003	Eugene P. Marsh	MI22-2382	2187

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SPOKANE, WA 99201

EXAMINER

VU, HUNG K

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,454

Applicant(s)

MARSH, EUGENE P.

Examiner

Hung Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29-37, 40-46 and 48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-37, 40-46 and 48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Attachment of 6,033,953.</u> |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 29, 33 and 37 are rejected under 35 U.S.C. 102(e) as being anticipated by

Nakamura (PN 6,232,629, of record).

Nakamura discloses a capacitor comprising,

a semiconductive substrate (102);

a roughened platinum layer (32,112) over the substrate, the roughened platinum layer comprising columnar platinum pedestals terminating in dome-shaped tops.

Regarding claim 33, Nakamura discloses the roughened platinum layer (32,112) has a continuous surface characterized by columnar platinum pedestals, wherein the column platinum pedestals have heights greater than or equal to about one-third of a total thickness of the roughened platinum. Note Figures 1 – 35 (especially Figures 2, 3A, 7 – 10D, and 24 – 32) of Nakamura.

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Regarding claim 37, Nakamura discloses the circuit further comprising an adhesion layer between the platinum layer and the substrate, the adhesion layer comprising at least one of IrO₂, RuO₂, RhO₂, or OsO₂.

Regarding claim 44, Nakamura discloses, as shown in Figures 1 – 35 (especially Figures 2, 3A, 7 – 10D, and 24 – 32), a capacitor comprising:

- a first capacitor electrode (32,112);

- a second capacitor electrode (35,116);

- a dielectric layer (8,114) between the first and second capacitor electrodes;

- wherein at least one of the first and second capacitor electrodes comprise roughened platinum, the roughened platinum having a continuous surface characterized by columnar platinum pedestals having heights greater than or equal to about one-third of a total thickness of the platinum layer;

- the platinum pedestals terminating in dome-shaped tops.

Regarding claim 45, Nakamura discloses both capacitor electrodes comprise platinum, but only one of the capacitor electrodes comprises the roughened platinum layer.

Regarding claim 48, Nakamura discloses the platinum pedestals terminate in hemispherical tops.

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2. Claims 29, 33-37, 40, 41, 44, 45 and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by Aoki et al. (PN 6,033,953, of record).

Aoki et al. discloses a capacitor comprising,

a silicon substrate (1);

a roughened platinum layer (38), the roughened platinum layer comprises columnar platinum pedestals terminating in dome-shaped tops. Note Figures 1A-14 (especially Figures 1B-1D) of Aoki et al.. See Attachment

Regarding claim 33, Aoki et al. discloses the roughened platinum layer (32,112) has a continuous surface characterized by columnar platinum pedestals, wherein the column platinum pedestals have heights greater than or equal to about one-third of a total thickness of the roughened platinum. Note Figures 1A-14 (especially Figures 1B-1D) of Aoki et al..

Regarding claim 34, Aoki et al. discloses the platinum layer has a thickness of at least about 600 angstroms. Note Column 4, lines 5 – 13.

Regarding claim 35, Aoki et al. discloses the platinum layer has a thickness of greater than or equal to about 400 angstroms. Note Column 4, lines 5 – 13.

Regarding claim 36, Aoki et al. discloses the platinum layer has a thickness of greater than or equal to about 100 angstroms. Note Column 4, lines 5 – 13.

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Regarding claim 37, Aoki et al. discloses the circuit further comprising an adhesion layer between the platinum layer and the substrate, the adhesion layer comprising at least one of titanium nitride.

Regarding claim 40, Aoki et al. discloses, as shown in Figures 1A-14 (especially Figures 1B-1D), a capacitor comprising:

- a first capacitor electrode (38);
- a second capacitor electrode (37);
- a dielectric layer (40) between the first and second capacitor electrodes;

wherein at least one of the first and second capacitor electrodes comprise roughened platinum, the roughened platinum having a thickness of from about 400 angstroms to about 1000 angstrom and comprising platinum pedestals that are at least about 300 angstroms tall and terminate in dome-shaped tops.

Regarding claim 41, Aoki et al. discloses the roughened platinum layer comprises hemispherical platinum.

Regarding claim 44, Aoki et al. discloses a capacitor comprising,

- a first capacitor electrode (38) over a monocrystalline silicon substrate (1);
- a second capacitor electrode (37);
- a dielectric layer (40) between the first and second capacitor electrodes;

wherein at least one of the first and second capacitor electrodes comprise roughened platinum, the roughened platinum having a continuous surface characterized by columnar pedestals having heights greater than or equal to about one-third of a total thickness of the roughened platinum. Note Figures 1A-14 (especially Figures 1B-1D) of Aoki et al..

Regarding claim 45, Aoki et al. discloses both capacitor electrodes comprise platinum, but only one of the capacitor electrodes comprises the roughened platinum layer.

Regarding claim 48, Aoki et al. discloses the platinum pedestals terminate in hemispherical tops.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30-32, 34-36 and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (PN 6,232,629, of record).

Regarding claims 30, 34-36, 40 and 42, Nakamura discloses the claimed invention including the circuit as explained in the rejection above. Nakamura further disclose the roughened platinum layer is continuous over an area of the substrate. Nakamura does not disclose the value of the area of the substrate and the thickness of the pedestals or the platinum layer. Although Nakamura does not teach the value of the area and the thickness of the pedestals or the platinum

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layer, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the substrate having the desired area and the pedestals or the platinum layer having the desired area and thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 31 and 41, Nakamura discloses the platinum layer comprises hemispherical grain platinum.

Regarding claims 32 and 43, Nakamura discloses the claimed invention including the circuit as explained in the rejection above. Nakamura does not disclose the area of the substrate comprises a square. However, it would have been obvious to one of ordinary skill in the art to form the substrate having the shape of a square since it is well settled that, the change in shape of the substrate was a matter of design choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the substrate was significant. *In re Dailey*, 357 F.2d 669, 149 USPTO 47 (CCPA 1996).

Regarding claim 46, Nakamura discloses the claimed invention including the circuit as explained in the rejection above. Nakamura does not disclose both capacitor electrodes comprise roughened platinum layers. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form both capacitor electrodes of Nakamura comprising

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roughened platinum layers in order to increase the surface area so that the value of the capacitor would be increased.

4. Claims 30-32, 34-36, 40, 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al. (PN 6,033,953, of record)

Regarding claims 30, 40 and 42, Aoki et al. discloses the claimed invention including the circuit as explained in the rejection above. Nakamura further disclose the roughened platinum layer is continuous over an area of the substrate. Nakamura does not disclose the value of the area of the substrate and the thickness of the pedestals. Although Nakamura does not teach the value of the area and the thickness of the pedestals, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the substrate having the desired area and the pedestals having the desired area and thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 31, Aoki et al. discloses the platinum layer comprises hemispherical grain platinum.

Regarding claims 32 and 43, Aoki et al. discloses the claimed invention including the circuit as explained in the rejection above. Nakamura does not disclose the area of the substrate comprises a square. However, it would have been obvious to one of ordinary skill in the art to form the substrate having the shape of a square since it is well settled that, the change in shape of the

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substrate was a matter of design choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the substrate was significant. *In re Dailey*, 357 F.2d 669, 149 USPTO 47 (CCPA 1996).

Regarding claim 46, Aoki et al. discloses the claimed invention including the circuit as explained in the rejection above. Nakamura does not disclose both capacitor electrodes comprise roughened platinum layers. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form both capacitor electrodes of Nakamura comprising roughened platinum layers in order to increase the surface area so that the value of the capacitor would be increased.

Response to Arguments

5. Applicant's arguments filed 01/30/06 have been fully considered but they are not persuasive.

It is argued, at pages 7-9 of the Remarks, that Nakamura does not disclose the roughened platinum layer comprising columnar platinum pedestals terminating in dome-shaped tops. This argument is not convincing because Nakamura clearly discloses, as shown in Figures 2, 31 and Col. 11, lines 17-18, the roughened platinum layer (6, 112) comprising columnar platinum pedestals terminating in dome-shaped tops. Note that the platinum layer 112 is oriented axially and has columnar crystal structure as shown in Figure 2.

The rejection of claims over the Inaba et al. reference is accordingly withdrawn.

Conclusion

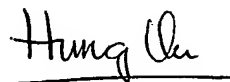
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Tuesday to Friday 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272 - 1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vu

April 14, 2005



Hung Vu

Primary Examiner

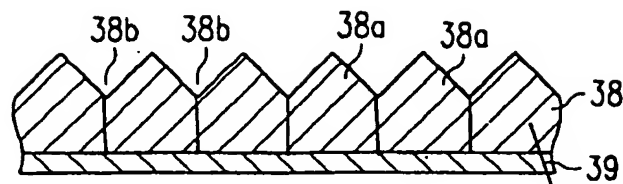


FIG. 1A

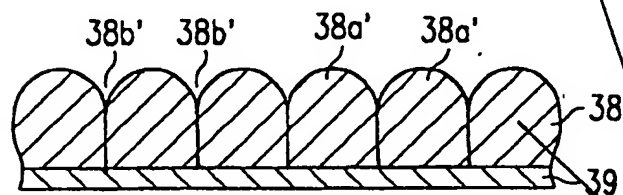


FIG. 1B

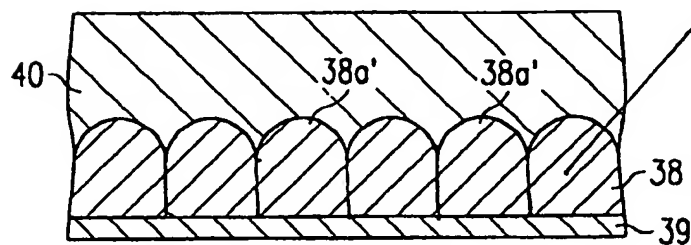


FIG. 1C

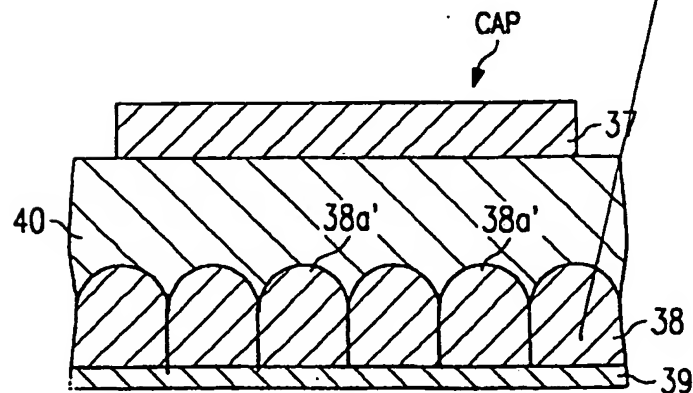


FIG. 1D

Columnar pedestals

Attachment